

# Oversize Transuranic Waste Laser-Cutting System

The U.S. Department of Energy's Nevada Test Site has 58 oversize boxes of transuranic waste that need to be reduced in size before they can be disposed. Los Alamos National Laboratory has glove boxes and other oversized transuranic and low-level waste. The Hanford Site and the Rocky Flats Environmental Technology Site have similar needs. Size and volume reduction are needed, along with decontamination, in order to transport the waste to the Waste Isolation Pilot Plant or dispose of it as low-level waste.

The DOE Office of Science & Technology has partnered with the DOE Nevada Operations Office to fund an Accelerated Site Technology Deployment project to deploy a remotely operated laser-cutting system for size reduction of oversized transuranic and low-level waste. The Office of Science & Technology is providing a total of \$1.71 million in FY1999-FY2001, primarily for design and procurement of the material handling system and the laser-cutting system. Sites interested in using this technology are responsible for the remaining project costs, which may include a containment structure, facility modifications, and operation and maintenance.

The initial deployment site for the remotely operated laser-cutting system will be at the Los Alamos National Laboratory. The laser-cutting technology consists of two major components: a material handling system and a laser-cutting system. The system will reduce the size of transuranic waste items using laser-cutting and robotics to minimize worker exposure to contamination and minimize the possibility of accidents. The project will be housed in the Decontamination and Volume Reduction System at Los Alamos National Laboratory.

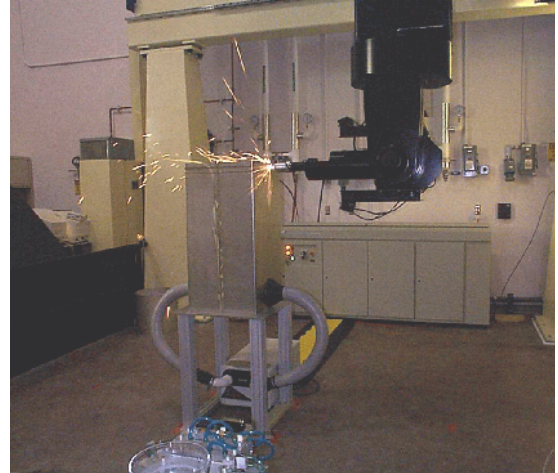


Photo courtesy of Sandia National Laboratories.

**Laser-Cutting System**

## Technology Need

Los Alamos National Laboratory, the Nevada Test Site, Hanford, and Rocky Flats Environmental Technology Site have published technology need statements for innovative size-reduction technology. The technology needs for the sites are as follows:

- Los Alamos National Laboratory: *AL-09-01-12-MW; Decontamination and Volume Reduction of Low-Level Metals*
- Nevada Test Site: *NV07; Oversize Transuranic Waste Size Reduction*
- Hanford: *RL-DD02; Glove Box Size Reduction System for the Plutonium Finishing Plant*
- Rocky Flats Environmental Technology Site: *RF-DD11; Size Reduction of Contaminated Equipment and Demolition Waste*



Each site has a technology need for a safe, efficient method of size reduction and/or volume reduction that decreases worker exposure to contamination and reduces the possibility of an industrial-type accident. At Los Alamos National Laboratory, decontamination may include laser-cutting to remove high contamination areas of otherwise low-level waste items. At the DOE Nevada Operations Office, oversize boxes of transuranic waste are being stored with no method of disposal without size reduction.

### **Project Description**

The project will be designed, constructed and operated by a team from Bechtel Nevada; Fluor Hanford, Inc.; and the Los Alamos National Laboratory.

The deployment of the laser-cutting system at the Los Alamos National Laboratory will be located inside the Decontamination and Volume Reduction System containment structure. The primary system unit is a shear baler, which will reduce size and volume by compacting oversize items. Decontamination will take place before the items enter the shear baler. Certain items will be brought to the laser-cutting location for size reduction or decontamination through the removal of "hot spots". Laser-cutting will be performed using two robots and a remote-controlled industrial laser.

### **Benefits**

The Oversize Transuranic Waste Laser-Cutting System will provide a safe and rapid means of size-reduction, volume reduction, and/or decontamination. Remote operation will minimize the need for workers to be exposed to contamination. Laser-cutting is several times faster than mechanical cutting, which also shortens exposure times compared to manual cutting.

The baseline technology that has been used is manual cutting, with workers dressed in protective equipment using hand-held mechanical cutting tools.

The productivity is very low because of putting on and taking off multiple periods of protective clothing each day. Mechanical cutting tools are inefficient and slow and subjects the worker to hazards such as puncture wounds, skin contamination, cuts, electrical shocks, and repetitive motion injuries.

### **Status**

This is a Fiscal Year 1999 Accelerated Site Technology Deployment project. Fiscal Year 1999 and 2000 funding has been received, and procurement of the laser-cutting system is underway.

In Fiscal Year 1999, the laser-cutting system and the material handling system were designed and procurement documents prepared. The remaining equipment design and procurement documents will be prepared with equipment procured in Fiscal Year 2000. Equipment installation and testing at Los Alamos National Laboratory should take place in Fiscal Year 2000 through 2001. Operation should take place in Fiscal Year 2001. Laser-cutting at other interested sites such as Hanford and Rocky Flats would occur after the Los Alamos National Laboratory deployment. The overall schedule depends on site funding.

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